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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/625,971	07/23/2003	Douglas Gene Keithley	MP0977(13036/18)	1604

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EXAMINER	
PATEL, KANJIBHAI B	

ART UNIT	PAPER NUMBER
2624	

DATE MAILED: 11/01/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/625,971	KEITHLEY, DOUGLAS GENE	
	Examiner	Art Unit	
	Kanji Patel	2624	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *23 July 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-24* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-8,10-12,14 and 16-24* is/are rejected.

7)☒ Claim(s) *9, 13, 15* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *23 July 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Information Disclosure Statement

1. Information Disclosure Statement submitted on 7/23/03, 2/14/05 and 9/14/06 have been considered by the examiner.

Drawings

2. Drawings filed on 7/23/03 have been approved by the examiner.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-8, 10-12 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over applicant's admitted prior art (Figures 1, 2A-2D; Pages 3-4 of the Specification) in view of Loce et al. (US 6,807,304 B2).

For claim 1, the applicant's admitted prior art discloses a method of image enhancement employing template matching (Figures 1, 2A-2D; paragraphs 6-9), the method comprising the steps of:

storing at least a portion of an image (paragraphs 6-7; 5x5 window is a portion of an image);

selecting from the image a window (5x5) comprising a plurality of adjacent line segments having pixels (Figure 2A), the window including a target pixel (3C is a target pixel);

comparing the pixels of the window with a template for match (paragraphs 8-9); and

responsive to a match being found, substituting an enhancement pixel for the target pixel (Figure 2D).

For claim 2, the applicant's admitted prior art discloses the method, further including the step of performing the method on a plurality of target pixels (page 4, lines 12-15).

For claim 3, the applicant's admitted prior art discloses the method, wherein the comparing step further includes the step of comparing a pixel subset of the window as defined by a mask of a template with a prediction pattern as defined by the template (paragraphs 8-9).

For claim 4, the applicant's admitted prior art discloses a method of image enhancement employing template matching (Figures 1, 2A-2D; paragraphs 6-9), the method comprising the steps of:

storing consecutive lines of an image (paragraphs 6-7; 5x5 window has 5 rows or lines);

selecting from the image a window comprising a plurality of line segments of bits representing pixels (Figure 2A), the window including a target pixel;

comparing a pixel-bit subset of the window (Figure 2B) as defined by a mask of a template with a prediction-bit subset (Figure 2C) as defined by a pattern of the template for a match;

responsive to a match being found, substituting an enhancement pixel for the target pixel (Figure 2D).

For claim 5, the applicant's admitted prior art discloses the method, wherein the pixel subset includes the target pixel (3C is a target pixel).

For claim 6, the applicant's admitted prior art discloses the method, wherein the pixel subset further includes pixels from the same line as the target pixel as well as pixels from at least one line above and at least one line below the target pixel (Figures 2A-2D).

For claim 7, the applicant's admitted prior art discloses the method, wherein the prediction-bit subset includes a designation of the pixel-bit subset for comparison (paragraphs 8-9).

For claim 8, the applicant's admitted prior art discloses the method, wherein the template includes an enhancement pixel to be substituted for the target pixel when a **partial** match is found (paragraphs 8-9).

For claim 10, the applicant's admitted prior art discloses the method, wherein the match is found if at least 90 percent of the bits of the pixel-bit subset compare with the prediction-bit subset (paragraph 9; matching is more than 90 %).

For claim 11, the applicant's admitted prior art discloses the method, the applicant's admitted prior art discloses the method, wherein the match is found if at

least 80 percent of the bits of the pixel-bit subset compare with the prediction-bit subset (paragraph 9; matching is more than 80%).

For claim 12, the applicant's admitted prior art disc the method, wherein the comparing step includes a further step of comparing a prediction-bit subset of a first template to a first pixel-bit subset of the window, and comparing a second prediction-bit subset of a second template to a second pixel-bit subset (paragraphs 8-9).

For claim 14, the applicant's admitted prior art discloses the method, wherein the substitution step further includes a step of selectively modifying the target pixel based on a comparison of the target pixel and the target pixel determined by the matched prediction-bit subset (Figures 2A-2D).

The applicant's admitted prior art discloses all the limitations except the template matching is applied **partially.** However, in an analogous art, Loce et al. disclose an optical character recognition using a **loose-**gray scale template matching process (column 5, lines 47-53; here loose-gray-scale template matching is not an exact matching and therefore corresponds to a partial matching; see also column 12, lines 15-24, column 10, lines 17-54). It would have been obvious to one of ordinary skill in the art to modify the admitted prior art by including the loose-gray-scale template matching (i.e. partial matching) as taught by Loce et al. because such a modification will enhance the appearance of the features, for example increasing the contrast or size of a small feature as shown by Loce et al. at column 6, lines 13-16.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 16-24 are rejected under 35 U.S.C. 102(e) as being anticipated by Loce et al. (US 6,807,304 B2).

For claim 16, Loce et al. disclose an image enhancement circuit (Figures 5A-5B), the circuit comprising:

a memory operable to store consecutive lines of an image (210 in Figure 6; column 7, lines 50-64);

a selector module operative to select from the image a window (step 330 in Figure 7; column 10, lines 17-28) comprising a plurality of line segments of bits representing pixels, the window including a target pixel (step 320 in Figure 7 is a target pixel);

a plurality of templates (at least step 300 in Figure 7 provides a plurality of templates), each template including a mask and a pattern;

a logic module operative to compare the pixels of the window with a template of the plurality of templates for a partial match (step 440 in Figure 8; column 5, lines 47-53; here loose-gray-scale template matching is not an exact matching and therefore

corresponds to a partial matching; see also column 12, lines 15-24, column 10, lines 17-54); and

a pixel substitution module operative to substitute an enhancement pixel for the target pixel in responsive to a partial match being found (at least step 480 in Figure 8).

For claim 17, Loce et al. disclose the circuit, where the logic module is at least partially implemented in hardware (Figure 5A, 170; Figure 3B).

For claim 18, Loce et al. disclose the circuit, where the logic module is further operative to compare a pixel-bit subset of the window as defined by a mask of a template with a prediction-bit subset as defined by a pattern of the template (Figures 3A-3B).

For claim 19, Loce et al. disclose the circuit, wherein the pixel-bit subset includes all the pixel bits of the window (Figure 3A).

For claim 20, Loce et al disclose the circuit, wherein the match is found if at least 90% of the bits of the pixel-bit subset compare with the prediction-bit subset (step 440 in Figure 8 loose-gray-scaly matching is not exact or 100% matching).

For claim 21, Loce et al. disclose the circuit, wherein the each template (300) includes an enhancement pixel (step 320) to be substituted for the target pixel when a match is found (step 340).

For claim 22, Loce et al. disclose the circuit, further including a rendering device (180 in Figure 5A is a rendering device) operative to reproduce the image with the enhancement pixel.

For claim 23, Loce et al. disclose the circuit, wherein the rendering device (180) is a selected one of a monitor, a projection unit, a laser printer, an ink-jet printer, a dot-matrix printer, a thermal printer, and a plotter.

For claim 24, Loce et al. discloses a computer system (Figures 5A-5B), comprising:

a processor (165; column 7, lines 65-67);

a memory accessible by the processor (column 7, lines 50-64);

a rendering device (180 in Figure 5A);

a circuit operable to store at least a portion of an image as pixels (210 in Figure 6; step 55 in Figure 2A);

select from the image a window (step 330 in Figure 7; Figure 3A) comprising a plurality of adjacent line segments having pixels, the window including a target pixel (step 320);

compare the pixels of the window with a template for a partial match (340 in Figure 7; step 440 in Figure 8);

responsive to a partial match being found (step 440, 470 in Figure 8), substitute an enhancement pixel for the target pixel; and

reproduce the image on the rendering device with the enhancement pixel (186).

Allowable Subject Matter

5. Claims 9, 13 and 15 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Prior art on record fails to teach or fairly suggest, assigning weights to each matched bit, and each matched bit is multiplied by the corresponding weight prior to determining a partial match as required by claim 9.

Prior art on record fails to teach or fairly suggest, if a partial match is found with a plurality of prediction-bit subsets, applying a priority scheme to determine which of the partially matched prediction-bit subsets is used to substitute the enhanced pixel in response to the partial match as required by claim 13.

Prior art on record fails to teach or fairly suggest, selecting at least one template from a plurality of templates, at least two of the templates of the plurality of templates being responsive to different errors in the target pixel, and each template including an enhancement pixel as required by claim 15.

Other prior art cited

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Bunce (US 5,237,646) discloses a pixel image enhancement employing a reduced template memory store.

Kobayashi et al. (US 5,014,330) disclose a pattern position recognizing apparatus.

Thompson, Jr. et al. (US 6,129,457) disclose a resolution enhancement for a digital printing apparatus.

Contact Information

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kanji Patel whose telephone number is (571) 272-7454. The examiner can normally be reached on Monday to Friday from 7:30 a.m. to 5:00 p.m. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bella, Matthew can be reached on (571) 272-7778. The fax phone number for the organization where this application or proceeding is assigned is (571)-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Kanji Patel
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10/28/06

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